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SURVEY OF SOVIET HEAVY INDUSTRY (7)

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SURVEY OF SOVIET HEAVY INDUSTRY (7)

This is a series report, published approximately bi-weekly, which contains items of interest on Soviet Heavy Industry as reflected in articles, short news items, announcements, etc., appearing in various USSR publications. The items contained in this report fall under the broad categories listed below in the table of contents.

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PUMPS AND COMPRESSORS

New Equipment for the Chemical Industry

The chemical industry is developing rapidly. Machinery builders must give chemical workers more and more various types of machinery equipment apparatus. However, it would be incorrect to concentrate merely on a quantitative growth. The duty of the machinery builders is to produce more productive chemical equipment which is reliable and safe for the persons operating it. In view of this we should like to discuss the problem of the hermetical sealing of machinery.

The modern chemical enterprise has much equipment which is used to transport liquids and gasses under pressure as well as equipment in which chemical and physical processes take place. We must say that the majority of this equipment has an extremely important shortcoming. The place where the shaft comes out of the body of the machine is packed in a manner which has never secured a complete hermetical sealing of the equipment especially under high pressure, high vacuum, and high RPM speeds. This often

New Equipment for the Chemical Industry (cont'd)

causes trouble in work stoppage, breaks into the rhythm of production and leads to the irreplacable loss of raw materials and finished product, as well as sharply worsening labor conditions.

It is partly because of this that the introduction of progressive technology is being retarded. For example, this was the case when one of the shops at the Leningrad Chemical-Pharmaceutical Plant (Farmakon) was put into operation. It was necessary to wait until hermetically-sealed electrical pumps which had been developed and produced by the Leningrad branch of the Scientific-Research and Design Institute for Chemical Machinery Construction and the Plant imeni Kotlyakova were delivered.

In the new hermetically-sealed machines which are built by our branch, the shaft of the mechanism is activated by a rotating magnetic field which reacts on a short closed rotter. The need for packing boxes and other packing methods is removed, and there is absolutely no run-off of product, and the working pressure (or vacuum) is increased.

New Equipment for the Chemical Industry (cont'd)

Hermetically-sealed machines and equipment are already being used at many chemical enterprises in the USSR and in many scientific-research institutes.

The Moscow Pump Plant imeni Kalinina was the first in the country to begin production on hermetically-sealed pumps. Unfortunately, the plant and the Moscow City Economic Council are slow about introducing production of the newest models of equipment.

In our opinion the organization of mass production of hermetically-sealed chemical-technological machinery is something that cannot be put off. Literally all the branches of the chemical industry, and not only of the chemical industry, are in great need of such machinery right now.

They are necessary for the extraction of heavy non-ferrous metals, rare earths and precious metals from ores and concentrates, and for the production of antibiotics, bacterial and mineral fertilizers, food products, and in the titanic industry.

The use of new equipment promises great economic advantages. In the course of a rather complicated chemical

New Equipment for the Chemical Industry (cont'd)

process under pressure of 25 atmospheres, thanks to intensive mixing, only five minutes were spent instead of three hours as usual. At the same time waste materials were cut in half. In another process the speed of reaction between gas, liquid, and powder was increased 10-12 times.

It is imperative to remember that this also brings an improvement in labor conditions for chemical workers. But, strange as it may seem, the All-Union Central Council of Trade Unions and its labor protection department is still paying too little attention to the introduction of hermetically-sealed machinery and apparatus which increases safety in chemically-hazardous shops.

We think that in the plans for new chemical enterprises it is already now necessary to provide for the use of such machinery in apparatus. In view of this the position taken by the State Planning Commission of the USSR and the RSFSR is disturbing. Up until now they have not made any decision as to the organization of mass-production of hermetically-sealed machinery and equipment. The quarry on this score to the State Planning Commission of the USSR

New Equipment for the Chemical Industry (cont'd)

by the directors of 12 of the largest Leningrad design and research institutes remained without answer.

The Leningrad machinery construction enterprises could insure the production of this type of machinery. The newly created All Russian Economic Council should think of organizing at least one chemical machinery construction plant within the framework of the Leningrad Economic Council.

The USSR Council of Ministers State Committee for automation and machinery construction also pays little attention to work done in this area by the Leningrad Scientific-Research and Design Institute for Chemical Machine Construction. In addition, the committee even intends to stop some of the work. This is an incorrect position.

The creation of hermetically-sealed machines is a new thing which has many excellent features. In this field it is unthinkable to use the usual individual efforts of designers, mechanics, electricians and chemical technologists. They must work together, developing and experimenting with individual components of the machinery, taking into account their mutual ties which are determined by the peculiarities

New Equipment for the Chemical Industry (cont'd)

of the modern aggregates. This system was excepted by us five years ago and gave positive results. Unfortunately, the State Committee for Automation and Machine Construction sees it in a different way. For example, they recommended hermetically-sealed machines to be developed individually, in two organizations -- The All-Union Institute of Hydro-machinery construction and the Scientific-Research Institute of Electro-Mechanics. This is hardly an intelligent decision. New technology must be created with new methods, not by hanging on to old, out-moded schemes.

One thing is clear and can not be argued against. Workers in the chemical industry must obtain reliable hermetically-sealed machinery of the new type as soon as possible. (Ekonomicheskaya Gazeta, 21 August 1960. Full translation).

New Blower

A train pulled out of the spur-line leading to the Nevskiy Machine Construction Plant imeni V. I. Leninina (Leningrad), loaded with the components and parts for a steam turbine. In producing it the enterprise collective delivered the equipment to the Nizhne-Tigal'sk Metallurgical Combine ahead of schedule.

For this leading structure of the Seven-year Plan the men from Leningrad produced a powerful blower aggregate. Its compressor, which is activated by a steam turbine, delivers 4,250 cubic meters of air per minute. The combine has also been sent four super-chargers with a productivity of 3,500 cubic meters of air per minute and are electrically operated. These machines allow the Ural metallurgists to apply special methods to the smelting of cast-iron. (Ekonomicheskaya Gazeta, 19 August 1960. Partial translation).

Diesel Compressor

In the laboratory of the gas-turbine equipment department of the Armenian Branch of the All-Union Scientific-Research Institute of Electro-Mechanics, successful tests are being conducted on the test model of a free-piston diesel compressor. It has been constructed at the request of the Erevan Compressor Plant.

The new type diesel compressor is a great improvement over the Vu3-8 piston compressor which was formerly produced by the Erevan plant. It is distinguished not only by a decrease in weight and greater ease of construction, but by an almost doubled use coefficient.

A combination gas turbine mobile electro-station is also being built here. The new generator can be used for power plants as well as a motor in transport and in agriculture. It weighs considerably less per unit of power and is of a simpler construction, operates vibration free, and is simple to handle. It can be put into operation with a press of a button. The life of the combination gas turbine plant is 2-3 times more than a diesel plant. (Ekonomicheskaya Gazeta, 24 August 1960. Full translation).

Piston Pumps

The Vil'nyus Puntukas Plant, which only recently organized the production of piston pumps, has already started mass producing them: (Sovetskaya Litva, Vil'nyus, 21 August 1960).

Compressor Production Automation

Considerable work in mechanization and automation of production processes is being conducted at the Erevan Compressor Plant. At the present time preparatory work is being conducted for the introduction of production of mobile small sized compressors for the needs of agriculture and construction, as well as compressors for countries with a tropical climate. (Kommunist, 18 August 1960. Partial translation).

MACHINE TOOLS

New Co-ordinate Machine Tool

The collective of the co-ordinate-cutting machine tool plant built the Soviet Union's first co-ordinate-cutting machine tool with programmed control. The new machine tool has an accuracy of up to 4 microns. It is designed for the tooling industry. (Sovetskaya Moldaviya, Kishinev, 28 July 1960. Full translation).

Bearing Tools

At one time the collectives of the Vitebsk Machine Tool Construction Plants imeni Komintera and imeni Kirova were subjected to criticism for the fact that they were producing machine tools which were far from perfect. This criticism was also meant for the designers who were not showing the necessary determination in the creation of new model machine tools.

We must say that the SKB-13 collective has not forgotten these critical remarks. There is now more planning and clearness of purpose in its activities. This can be shown in the example of our group, which is working on the creation of improved machine tools for the machining of ball bearings surfaces. It is true that our work is not yet complete, but we can already say that many problems have been solved. Much has been done to make the machine tools easier to operate, smaller in size, and most important -- highly productive.

Our collective is now busy creating a machine tool for the preliminary polishing of VSh-150 ball bearings. It is estimated that it will out do its predecessor by

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3-4 times in productivity. (Sovetskaya Belorussiya, 24 July 1960. Partial translation).

New Type Semi-Automatic Machine Tool

At the Moscow Special Machine Tool and Aggregate Component Plant a new type semi-automatic machine tool has been created and is operating successfully. It is designed for hardening gears "tooth by tooth" by high frequency current. The power of the generator is used at 95%. The hardening process has been more than doubled.

With the aid of the semi-automatic machine tool it is possible to harden gears of any diameter -- conical, cylindrical, and with oblique teeth. The design of the semi-automatic tool is so simple that it can be produced by any machine tool construction plant. The designer is A. Zavidovskii, colleague of the All-Union Planning Technological Institute. (Ekonomicheskaya Gazeta, 21 July 1960. Full translation).

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Special Machine Tool

Engineers have long been wondering about how to find another more effective method of producing gears. Finally this search has been successful. The so-called hot rolling method has been recognized as the best.

A group of engineers from the Orgstankinprom Institute together with the collective of the Dmitrovsk Experimental Mechanical Plant are now constructing a special machine tool for producing tooth gears by the new method. It alone will replace several ordinary tooth cutting machine tools.

Inspired by the decisions of the recent Plenum of the Central Committee of the CPSU, the plant workers have obligated themselves to complete the machine tool by the end of July. Right now electrical workers under the leadership of Foreman I. Gromov, metal workers V. Pavlov, I. Sal'nik, and V. Kurkin, together with a brigade of adjusters from the institutes led by V. Gosgubkov are working with doubled energy. (Leninskoye Znaniye, 20 July 1960. Partial translation).

ELECTRICAL POWER EQUIPMENT

New Steam Turbine

The country's largest heating steam turbine, with the power of 50,000 kilowatts, has been built at the Ural Turbo-motor Plant (Sverdlovsk). Besides electrical energy the new aggregate can heat a city with a population of more than 60,000. The turbine operates on raised steam parameters under a pressure of 130 atmospheres and a temperature of 565 degrees centigrade. Two-stage water heating is used here for the first time. A high degree of automatic operation has been achieved in the aggregate. (Izvestiya, 13 September 1960. Full translation).

Giant Turbine

The development of the technical plans for the K-500-240 single shaft steam turbine has been completed ahead of schedule at the Khar'kov Turbine Plant imeni Kirova. It has a capacity of 500,000 kilowatts. This aggregate is the largest in the world and is 200,000 kilowatts more powerful than the single shaft steam turbine which is being constructed presently at the enterprise. (Komsomol'skaya Pravda, 28 August 1960. Full translation).

Giant Turbine

4,800,000,000 kilowatt hours of electricity are developed per year by the K-800-240 steam turbine, the plan for which has been completed at the Khar'kov Turbine Plant. This is almost $2\frac{1}{2}$ times more than all the power stations of Tsarist Russia produced in 1913.

The worlds largest dual-shaft steam turbine with a capacity of 800,000 kilowatts is being built under the direction of Chief Designer of the plant, corresponding member of the Ukrainen SSR Academy of Sciences L. A. Shubenko-Shubin. (Sovetskaya Litva, 13 August 1960. Full translation).

Unique Transformer

At the Moscow Transformer Plant a unique transformer with a capacity of 60,000 kilovolt amperes with a tension of 220 kilovolts has been assembled and has passed inspection. On 8 September assembler Andrey Sotnikov, together with his comrades, began dismantling the gigantic transformer for delivery. (Izvestiya, 9 September 1960. Full translation).

Aluminum Windings

At the Korgan Electro-mechanical Plant the first electric transformer with aluminum instead of copper windings have been produced. They have been proven through static testing.

The transformers from the Kurgan Plant are all rural power stations and are being produced in large quantities. It is estimated that the use of aluminum will save up to 40 tons of copper per year. (Ekonomicheskaya Gazeta, 14 August 1960. Full translation).

VEHICLES

Bulldozers to Cuba

The Chelyabinsk Mobile Machinery Construction Plant imeni Kilyushchenko has sent a power D-259 bulldozer to the Cuban Agrarian Institute. Five more such machines are about to be delivered.

The Chelyabinsk tractor builders are also contributing to the development of the Cuban Republic. They will soon send fifty C-100 tractors. (Ekonomicheskaya Gazeta, 19 August 1960. Partial translation).

New Vehicles

123 persons can be seated in the new trolley-bus which will soon go into service on the streets of Moscow. The new type of trolley-bus is produced in the Urizkiy Plant in Saratov. After successful testing, the increase in capacity will be effected through the use of one or two additional units attached to the back of trolley-buses and buses.

Moscow city transportation, in rush hours and on Sundays, has enormous demands made on it. The Moscow subway carries up to 50,000 passengers per hour. Local and express bus lines as well as trolley-bus lines between the downtown area and the popular recreation area, Serebryanny Bor, offer a capacity of 8,000 seats per hour in rush hour times. In Moscow there are presently 123 bus lines with a total length of 2500 kilometers, 32 trolley-bus lines with a total length of 370 kilometers, 42 street-car lines with a total length of 500 kilometers and the subway with a length of 76 kilometers.

A high performance, two-seat sports car, with a speed of 250 kilometers per hour, is being designed in the test

New Vehicles (cont'd)

section of the Moscow Likhachev Motor Vehicle Plant. The car is called the Sil-112-6. It has an eight cylinder engine, and the body is of aluminum.

The Soviet small truck from Kiev has a load capacity of 500 kilograms at a speed of 80 kilometers per hour. The truck has an empty weight of 550 kilograms. (Kraftfahrzeugtechnik, Berlin, No. 10, October 1960, pages 420-421.)

New Trucks

In honor of the 43rd Anniversary of the Great October Revolution, the Gorkiy Motor Vehicle Plant will start testing six experimental models of trucks, including the 3 - 4 ton GAZ-53 and three 2.5 ton GAZ-52 trucks. (Pravda, 16 September 1960).

Motor Vehicle Production

According to data released by the Central Statistical Administration, the Soviet Union last year produced 124,500 passenger cars, 500,000 motorcycles and motorscooters, 3.3 million bicycles and motor-bikes. (Izvestiya, 9 September 1960. Partial translation).

GAZ-51 Water Pumps

Among products produced by the tool and machine shop of the Kishinev Avtodetal' Plant are high quality water pumps for the GAZ-51 truck. (Sovetskaya Moldaviya, 14 August 1960).

Trailer-Bus

The PAZ-672 trailer-bus, built at the Pavlovsk Bus Plant, is a conventional bus with a capacity of 42 passengers pulling a trailer with a capacity of 13 passengers. This bus-trailer combination is extremely comfortable and can attain speeds up to 90 kilometers per hour. A test model of the PAZ-652 bus has already been constructed. This is an excursion bus. The interior is spacious and light the seats are comfortable and the windows afford an excellent view.

Another tourist bus, called the Karpaty has been produced by the L'vov Plant. This bus is comfortable and is for long trips. The Karpaty's engine is placed in the rear. Therefore, the exhaust gasses do not penetrate into the passenger compartment, and the noise remains outside the passenger area. The bus contains a cloak-room, a buffet, and toilet. The bus is equipped with radio. For safe travel in snow and fog the bus is equipped with fog lights. (Sovetskaya Rossiya, 13 August 1960. Full translation).

Motorcycle Spare Parts

An editorial was placed in Pravda according to which motorcycle owners can not find spare parts and tires. The vice-chairman of the State Planning Commission of the USSR, Comrade Strokin informed the editors that inquiry as shown that some motorcycle plants in the RSFSR and the Ukrainian SSR have been tardy in their shipments of spare parts to Rosposyltorg and Tsentrosoyuz. The USSR State Planning Commission has asked the RSFSR and the Ukrainian SSR Council of Ministries to take measures for improving the delivery of spare parts from motorcycle factories to retailing organizations as well as to increase production on them in 1961.

In 1961, the State Planning Commission of the RSFSR reports, production of spare parts for M-72 motorcycles will be increased 59%, and for IZh-49 and IZh-56 -- by 36%, and for K-55, K-58, and K-175 motorcycles -- by 38%. The Udmurt in Sverdlovsk Economic Councils have been urged to have their plants this year produce basic parts for motorcycles in the quantity established by the Soyuzglavtorg with the USSR State Planning Commission. (Pravda, 23 September 1960. Full translation).

Mail Order Parts

Izhevskaya Base "Posyltorg" of the RSFSR Ministry of Trade is delivering spare parts to Vyatka-150 motorscooters by mail by individual COD orders to citizens of the Uzbek SSR. Persons can acquaint themselves with the list of parts on sale at branch postoffices. The list and COD blanks are sent out upon request with conclosure of 60 kopecks in postage stamps. Orders are taken by all branch postoffices. Send orders to the following address: Izhevsk, Udmurt ASSR, Karlutskaya Haberezhanaya, 9-A, Izhevskaya "Posyltorga" Base. (Pravda Vostoka, 9 August 1960. Full translation).

SELF PROPELLED MACHINERY

Power Shovels

The Tallin Power Shovel Plant has failed to fulfill its plan for the production of power shovels, the Tallin Vol'ta Plant has failed to fulfill its plan for the production of electric motors. (Sovetskaya Estoniya, Tallin, 12 August 1960.)

Rotary Power Shovels

The collective of the Stalino Machine Construction Plant imeni The Fifteenth Anniversary of the Komsomol of the Ukraine has made a glorious start in the Seven-year Plan. In the first year a new great step has been made in the direction of technological progress; the countries first rotary power shovel has been produced with a productivity of 1,000 cubic meters of earth per hour. The power shovel weighs about 400 tons. It replaces ten ESh-6-60 complex and heavy self-propelled cyclical power shovels.

The machine can scoop from both above and below. The maximum height of digging is 20 meters higher than the level of the power shovel, and its maximum depth is 3 meters lower than the level. The cutting radius is 24 meters.

The first rotary machine will be used for the mines of Chasy Yar. A second power shovel has also been produced. In 1960 there will be 6 power shovels developed. They are designed for extracting iron-ore at the Kursk Magnetic Anomaly, in the Krivoryz ore basin, copper ore at the Gay-skoie deposits in the Orenborg Oblast.

Rotary Power Shovels (cont'd)

The plan for the power shovel was developed at the Novo-Kramatorsk Machine Construction Plant. During its construction, much was suggested by the designers of the Plant imeni Fifteenth Anniversary of the Komsomol of the Ukraine. In particular, the blades of the rotor have been constructed in a different manner, and there have been innovations in the reduction gear construction. (Pravda Ukrainyy, 26 August 1960. Partial translation).

New Scraper

The Mozyr' Land Reclamation Machinery Plant has started production on the new D-357 scraper. It has a hydrolic scoop with a capacity of 11 cubic meters. The scoop is filled within 2 minutes and can be transported a long distance and unloaded at a construction site in an even layer of a given thickness. The driver of the machine handles all operations himself thanks to the hydraulic mechanism.

The new machine will find broad application at various projects. The plant will produce dozens of these new scrapers this year.

At the same time tests are being conducted on new types of drainage ditch machinery, the first models of which have been recently produced by the collective of the enterprise. In addition, the Mozyr' Machinery builders are preparing to produce a milled ditching machine, a universal frame, a clip ditching machine, and other new machinery for the Seven-year Plan. (Sovetskaya Belorussiya, 26 August 1960. Full translation).

New Machines to Serve City

The modern city is unthinkable without machines to serve it. They clean the streets, wash and sweep them, water the grass on public squares and boulevards, remove snow in the winter. The professions of "man with a broom" is disappearing. The doorman is becoming a machine operator.

What type of new machines will appear on the streets of our cities in the coming years? Here is an ordinary vehicle from the Ul'yanov Motor Vehicle Plant. Only its body has been changed, above which are placed horizontal and vertical brushes. Unlike other machines, it is operated hydraulically. When not being used, the brushes are retracted automatically within the body, which is used as a garbage carrier.

This same vehicle from the Ul'yanov Motor Vehicle Plant is transformed into a "water service first aid". An electronic device is set up on it which determines the place of water service break or a leak. The machine will also be equipped with a small electrical power plant, a water pump, an air blower, and a radio transmitter.

The streetcar is a tried and true form of urban transportation. But the streetcar which we were shown was not exactly the same as those we see every day. Inside the car is "hidden" a telescopic tower. A turn of a lever -- and a platform for repairing the electrical feeding system rises above the car. Our cities will also see the first self-propelled trolley carriages, which are designed for checking the condition of the streetcar lines.

Constructors have already re-evaluated the test model of a handy mobile mechanism for freight lifting to a height of 15 meters, which has been developed by the Planning, Design Bureau of the RSFSR Academy of Communal Economy. This hoist folds in two and is easily transferred from the site to another.

Another hoist mechanism is called "indoor" -- it freely passes through an ordinary door. Such a small crane is necessary for repairing the floors and ceilings within a building. Other machines are also being developed in the plan-design bureau of the academy. They are designed for serving the modern city with its complex communal economy. (Ekonomicheskaya Gazeta, 14 August 1960. Full translation).

METALLURGICAL INDUSTRY

Unique Cranes

The machinery builders of the Novokramatorsk Plant have produced the Soviet Union's first steel-pouring crane with a capacity of 420 tons. It is designed for serving an open-hearth furnace with a capacity of 600 tons.

The unique crane, having a running length of 22 meters, can lift and transport in three stages molten steel to a height of 18 meters. The crane operators cabin is securely protected from the extreme heat by air-conditioning. Communication between the crane operator and the pourers is conducted by means of a portable radio transmitter.

In view of the further growth in the capacity of smelting aggregates in modern metallurgy, the Novokramatorsk machinery builders are developing a plan for a steel-pouring crane with a load capacity of 560 tons. This unique machine will service open-hearth furnaces with a capacity of 850 tons, the construction of which is provided for in the Seven-year Plan. (Kommunist, 27 August 1960. Full translation).

Unique Sheet-Steel Atacker

Recently a freight train loaded with unique equipment left the spur-lines leading to the Irkutsk Heavy Machine Construction Plant imeni Kuybysheva. The freight car were loaded with an automatic aggregate for stacking sheet-steel of large dimensions. The aggregate was produced by the Siberian machine builders on the plans prepared by the designers of the Starokramatorsk Plant imeni Ordzhonikidze. This is our country's first automatic sheet-steel stacker.

The aggregate is formed of a series of improved mechanisms and is capable of sorting, stacking, counting, and packing steel-sheets without an operator. Various electronic impulses, photo-electric relays, and terminal switches insure the accurate fulfillment of the program.

The test model of country's first automatic sheet-steel stacker is designed for servicing Europe's largest rolling-mill, the "2500", which has been put into operation at the Magnitorsk Metallurgical Combine. (Trud, 14 August 1960. Partial translation).

MISCELLANEOUS

Automation University

A univeristy for automation has been opened in the capitol of the Moldavian SSR, Kishinev. 120 engineers, designers, and technicians are participating in the first session. 30 plants in the Moldavian Republic will receive automated production lines this year. The university will serve as a means of providing plant specialists with the necessary knowledge for servicing these facilities. (Maschinenvau Technik, Berlin, No. 10, October 1960, pages 535-536).

Plant Consolidation

Two enterprises in Tallin, the "Metall" Combine and the "Tekhnik" Plant are merging with the "Teras" Plant and are forming a unified machine construction plant under the name "Teras". (Sovetskaya Estoniya, 31 August 1960. Full translation).

Raw Materials Savings

At the Tashkent Tashavtomash Plant, expenditures of raw materials and other materials for producing the PTS-3 truck-trailer were 1,576 rubles in 1958. For the 1959 plan they were figured in the sum of 1,635 rubles, but they actually were 1,506 rubles. This is not surprising because only 9.6 kilograms of nitro-enamel was used per trailer with a planned norm of 14.8 kilograms, solvent -- 14.3 and 26.7 kilograms correspondingly, etc.

In order to produce a ton of cast-iron, Baranovich Machine Tool Equipment Plant expended a total value of 683 rubles worth of raw materials and other materials in 1958. The plan for the following year provided for an increase of 414%, but the actual amount spent was only 662 rubles, or 7% under the plan.

The expenditure of thin-walled seamless pipes for last year was the following: for producing 1 K-58 motorcycles in the Vladimir Economic Council -- 61.4% of the established norm, and for the production of a motorscooter in the Kirov Economic Council -- 48%. The expenditure norm

Raw Materials Savings (cont'd)

for calcium soda for the production of a ton of industrial soap in the Azerbaijan SSR was 55.3% more than that actually expended, and in the Uzbek SSR -- 34% higher, etc. (Ekonomicheskaya Gazeta, 13 August 1960. Partial translation).
